Vision Protection Army Technology Objective (ATO) Overview for GVSET VIP Day

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13. SUPPLEMENTARY NOTES

Presented at NDIAs Ground Vehicle Systems Engineering and Technology Symposium (GVSETS), 17 22 August 2009,Troy, Michigan, USA, The original document contains color images.

14. ABSTRACT

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Vision Protection ATO
Protection for Eyes & Cameras from Lasers

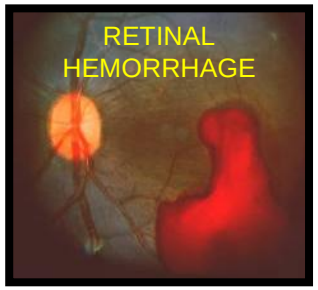
Problem: Lasers can disable vision systems

Mission:
- Provide solutions protecting eyes and day-vision cameras from laser weapons.

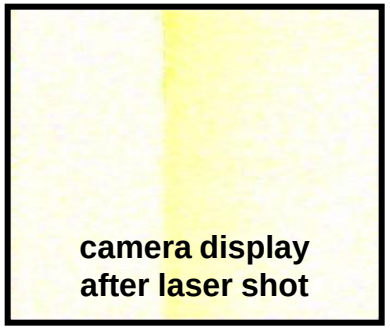
Objective:
- Develop materials that limit the amount of light energy allowed to the sensor
- Develop new optical system designs allowing the integration of advanced laser protection materials

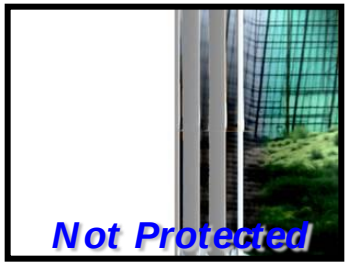
Method:
- Integrate protection materials into optical systems and test in lab & field.
- Demonstrate relevant designs to customers (GCV & HBCT).

Eye Damage



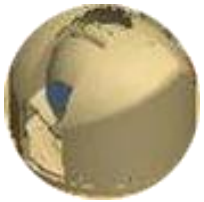
Camera Damage





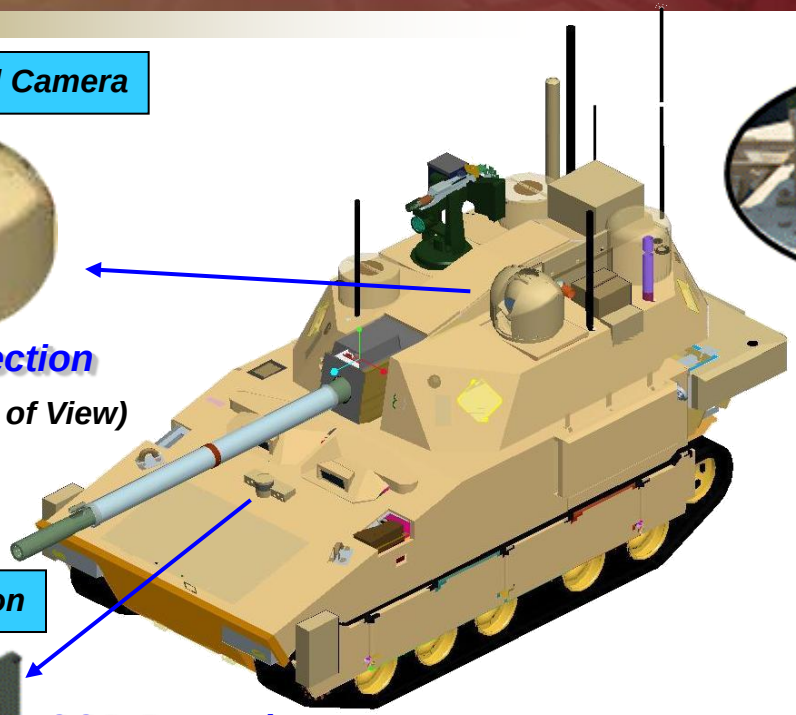
TARDEC Demo Areas

Fire Control Camera

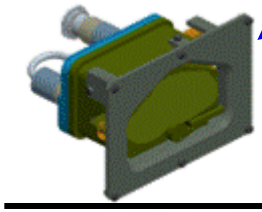


CCD Protection

(Narrow Field of View)



Driver's Vision



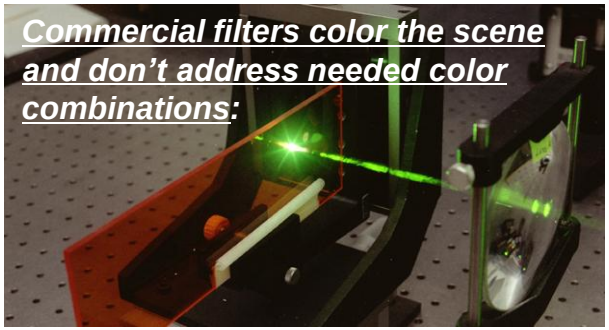
CCD Protection

(Wide Field of View)

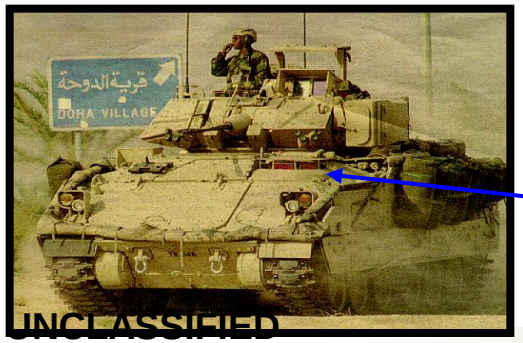
Optical Fire Control

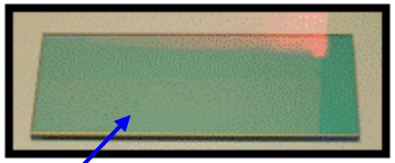
EYE Protection

Commercial filters color the scene and don't address needed color combinations:



Fielded Hazard Protection:





Fielded Filter protects from laser rangefinders & designators

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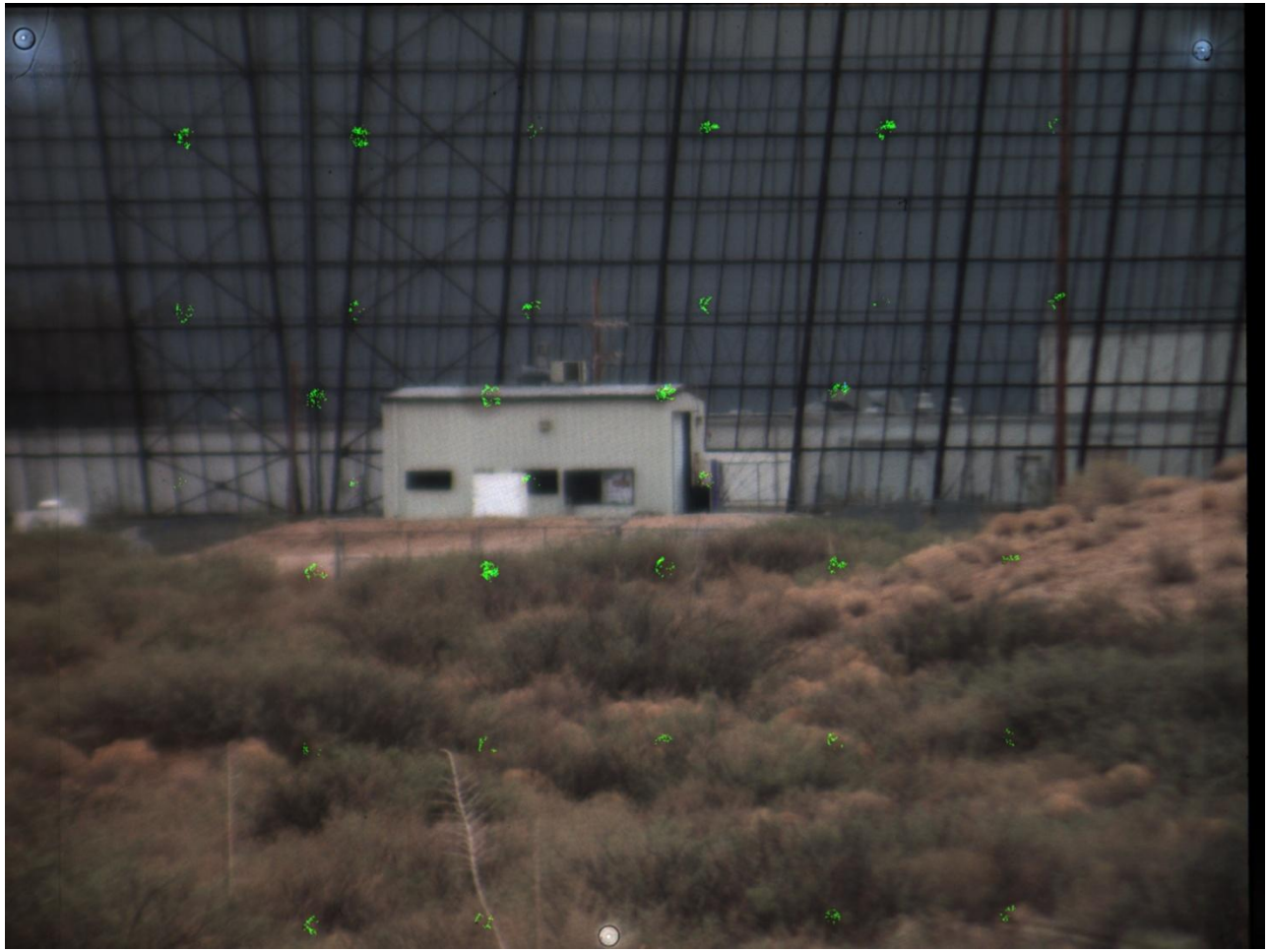
Camera Output after Laser Exposure

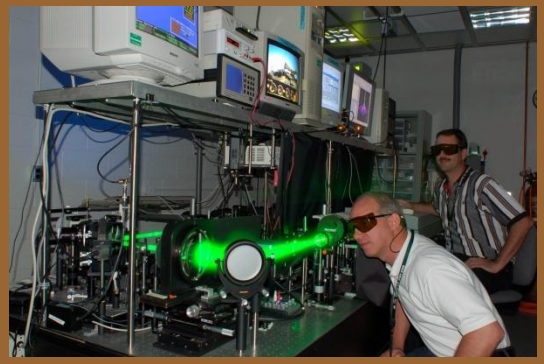
Protected Camera Output after Laser Exposure



Laser Lab Capabilities

Current test capabilities:

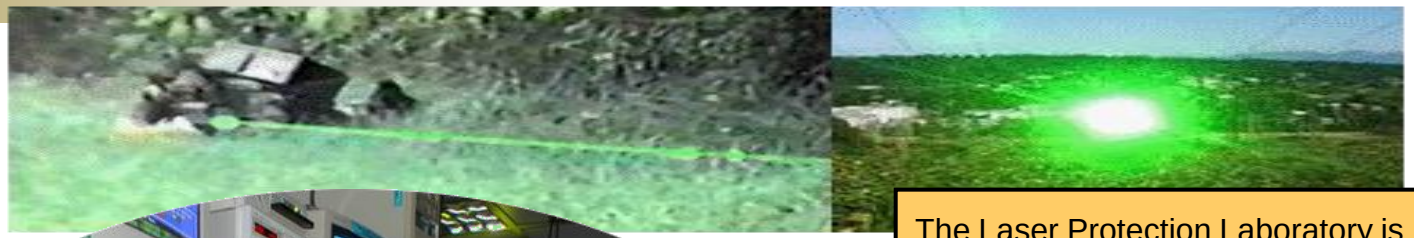
- Laser-induced damage threshold testing of camera image sensors
- Non-linear optical material characterization
- Photopic and NVG-weighted transmission measurements of transparent armor
- Haze measurements

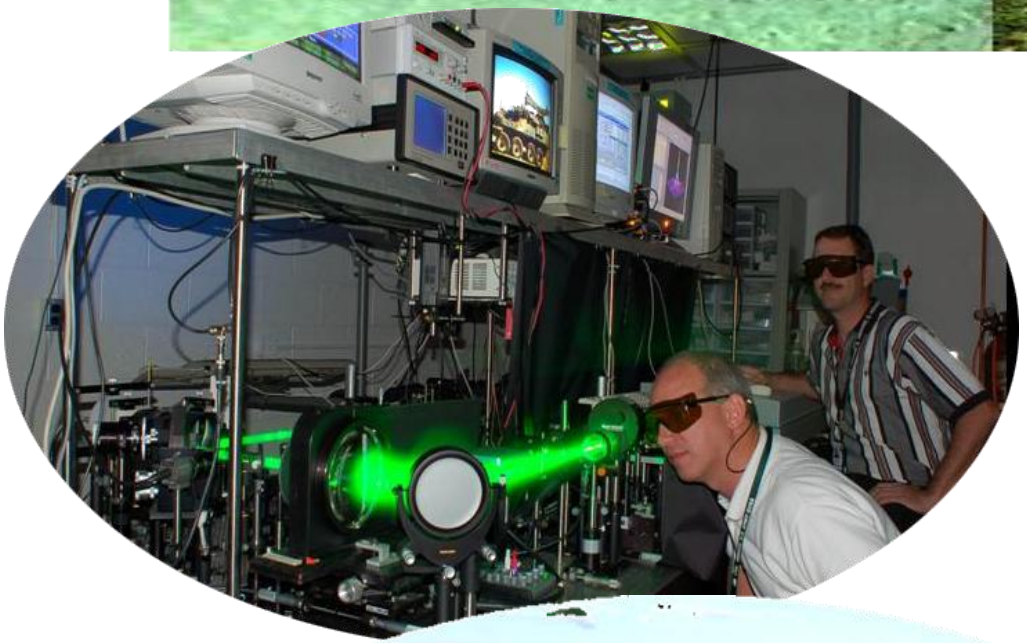


Additional capabilities:

- Optical design & analysis
- Mechanical design
- Laser hazard assessment
- Image analysis & processing
- Laser beam diagnostics
- Measurement automation
- Technical computing
- Photometric measurement
- NLO material integration on cameras
- Digital and film photography
- Microscopic examination

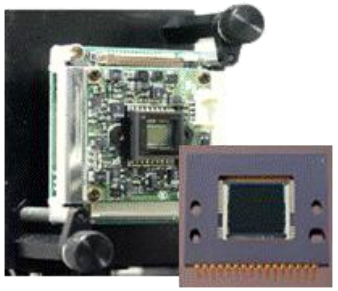
Laser Protection Research & Integration Laboratory





The Laser Protection Laboratory is used to develop and evaluate techniques to harden combat vehicle day vision optics against multiple battlefield laser hazards and threats. In this laboratory, engineers and scientists conduct various optical performance tests on vision devices and laser protection filters, as well as conduct advanced research in nonlinear optical materials and novel optical design development. The laboratory is located in a Class 100,000 clean room and the available equipment includes several laser sources, detection devices, spectrometric instrumentation, optical test benches, laser beam profiling systems, optical microscopes, and computer support facilities.

- *Lab & field experience*
- *Strong collaboration with OGAs and Industry*



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